

WHAT IS CLAIMED IS:

1           1.     Apparatus for processing products for increasing the density of  
2     particulate matter in a powderized form comprising:  
3                 feed means for directing particulate matter into a pelletizing mill, the  
4     particulate matter being in a first powderized form and having a first density;  
5                 a pelletizing mill for generating pellets of the particulate matter; and  
6                 means for milling the pellets into a second powderized form, whereby  
7     the second powderized form of the particulate has a greater density than the first  
8     density.

1           2.     Apparatus as claimed in claim 1 wherein the formed pellet  
2     substantially excludes diluents or fillers.

1           3.     Apparatus as claimed in claim 1 wherein the formed pellet  
2     substantially includes diluents or fillers.

1           4.     Apparatus as claimed in claim 1 including means to introduce steam  
2     into the pellet mill during the formation of pellets.

1           5.     Apparatus as claimed in claim 1 wherein the products include  
2     materials for at least one of a pharmaceutical, nutritional or herbal end product.

1           6.     Apparatus as claimed in claim 1 including means for applying  
2     saturated steam at a selected temperature and pressure and condensation characteristic  
3     to the pellet mill during pelletization thereby to increase the moisture content of the  
4     product.

1           7.     Apparatus as claimed in claim 6 wherein the product with increased  
2     moisture content is forced under pressure through a spinning perforated dye of a

3 predetermined dimension thereby to obtain a pellet of a selected size, the forcing  
4 through the dye being effected selectively by counter rotating roller means.

1 8. Apparatus as claimed in claim 7 including means to cool the pellets to  
2 a substantially ambient temperature prior to being milled by the milling means.

1 9. Apparatus as claimed in claim 1 including pre-milling for processing  
2 raw materials to obtain a particulate matter for feeding into the pelletizing mill.

1 10. Apparatus as claimed in claim 1 wherein the size of particulate in the  
2 first form is in a range of about 150 to about 250 microns.

1 11. Apparatus as claimed in claim 1 wherein the pelletizing mill includes a  
2 conditioning chamber, and wherein the particulate material in the conditioning  
3 chamber is penetrated by at least about 95% substantially pure saturated steam under  
4 a pressure of about 40 to about 80 PSI at about a temperature of about 180°F to about  
5 400°F thereby to hydrate the particulate matter at a temperature of about 80°F to  
6 200°F and thereby add about 1% moisture to the particulate matter.

1 12. Apparatus as claimed in claim 11 including a cooler at an outlet from  
2 the pelletizing mill, the cooler being for permitting ambient air to pass through a bed  
3 containing pellets discharged from the pelletizing mill.

1 13. Apparatus as claimed in claim 1 wherein the milled pellets output in a  
2 powdered form has an approximate size between about 100 to about 1300 microns,  
3 or of a size where about 100% of the powdered product is passable between a 14  
4 mesh to a 150 mesh.

1 14. Apparatus as claimed in claim 1 wherein the powdered form of the  
2 milled product has a particle size permitting about 100% passage through a 60 to 80  
3 mesh.

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1           15.     A product produced by the apparatus of claim 1 wherein the  
2     powderized form of the product is relatively denser, or coarser, or capable of  
3     improved flow with less dust or relatively more compressible than the particulate  
4     matter.

1           16.     A product produced by the apparatus of claim 1 including means for  
2     forming the output product in the second powderized form into, selectively, tablets,  
3     capsules, or powder blends and selectively with at least one other ingredient.

1           17.     A product produced by the apparatus of claim 1, wherein a  
2     powderized product in the second form has relatively greater granularity than the  
3     particulate matter in the first form.

1           18.     A method for processing products for increasing the density of  
2     particulate matter in a powderized form comprising:  
3                 forming pellets of the particulate matter, the particulate matter having  
4     a first density; and  
5                 milling the pellets into a powderized form, whereby the powderized  
6     form of the particulate in the second format is a greater density than the first density.

1           19.     A method as claimed in claim 18 wherein the formed pellets  
2     substantially exclude diluents or fillers.

1           20.     A method as claimed in claim 18 wherein the formed pellets  
2     substantially include diluents or fillers.

1           21.     A method as claimed in claim 18 including selectively introducing  
2     steam into the product during the formation of pellets.

1           22.     A method as claimed in claim 18 wherein the products include  
2     materials for at least one of a pharmaceutical, nutritional or herbal end product.

1           23.    A method as claimed in claim 18 including means for applying  
2 saturated steam at a selected temperature and pressure and condensation characteristic  
3 during pelletization.

1           24.    A method as claimed in claim 23 including forcing the product with  
2 increased moisture content under pressure thereby to obtain a pellet of a selected size.

1           25.    A method as claimed in claim 24 including cooling the pellets to a  
2 substantially ambient temperature prior to milling.

1           26.    A method as claimed in claim 18 including conditioning the particulate  
2 material thereby to cause penetration by at least about 95% substantially pure  
3 saturated steam under a pressure of about 40 to about 80 PSI at about a temperature of  
4 about 180°F to about 400°F thereby to hydrate the particulate matter at a temperature  
5 of about 80°F to about 200°F and thereby add about 1% moisture to the particulate  
6 matter.

1           27.    A method as claimed in claim 18 including cooling the pellets by  
2 passing ambient air through a bed of discharged pellets.

1           28.    A product produced by the method of claim 18 wherein the  
2 powderized second form is denser, relatively coarser, capable of improved flow with  
3 less dust, or relatively more compressible than the particulate matter in the first  
4 format.

1           29.    A product of claim 26 including forming the powderized second form  
2 of the product into selectively tablets, capsules, or powder blends and selectively  
3 adding at least one other ingredient.